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Hisao Sasai

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EXAMINER

KIM, HEE-YONG

ART UNIT

PAPER NUMBER

2482

NOTIFICATION DATE

DELIVERY MODE

11/15/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/587,939	Applicant(s) SASAI ET AL.	
	Examiner HEE-YONG KIM	Art Unit 2482	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/2/2006 and 10/15/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. **Claims 20-21** are rejected under 35 U.S.C. 101 because they are directed towards nonstatutory subject matter. The computer program per se is not statutory.
C) The computer program as claimed doesn't isn't properly associated with the operation. It is quite possible that the computer program may be an unrelated sub-routine or a simple commence instruction which then causes the computer to execute the operation that could be self-resident, and not encoded on the medium. The Examiner suggests that the computer program be more directly associated with the operation, Interim Guidelines, Annex IV (Section b). Correction to the claims, and supporting specifications are required.

For the prosecution of the application, examiner interprets claims as computer readable medium claims.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1, 2, 6, 8, and 17-21** are rejected under 35 U.S.C. 102(b) as being anticipated by Puri (Signal Processing Image Communication 2 (1990), No.2), hereafter referenced as Puri.

Regarding **claim 1**, Puri discloses Video Coding With Motion-Compensated Interpolation For CD-ROM Applications. Specifically Puri discloses A decoding device (Fig.7 CMCI-MPEG Decoder), comprising:
decoding unit (Fig.7) operable to decode an encoded image signal (Bitstream, Fig.7) which is obtained by encoding image frames (Fig.5 CMCI-MPEG encoder) which form an image signal, and additional information (MCIE (Motion Compensated Interpolation Error), pp.131 left col., paragraph 2) for creating an interpolation frame which interpolates the image frames based on a first motion vector (d_{02} , Fig.2) which is a motion vector between the image frames (F0 and F2, Fig.2);
motion vector detection unit operable to detect a second motion vector (d_{01} and d_{12} , Fig.2) which is a motion vector between the image frames which are decoded; and
interpolation frame creation unit operable to create an interpolation frame based on the second motion vector (blocks b0 and b2 are averaged to yield interpolation, pp.131, right col., line 1-3), the image frames (F0 and F2, Fig.2) which are decoded, and the additional information (MCIE, pp.131, right col., line 1-3) which is decoded.

Regarding **claim 2**, Puri discloses everything claimed as above (see claim 1). In addition, Puri discloses wherein the additional information includes at least one of: an interpolation method for the interpolation frames with respect to the image frames; residual information (MCIE, pp.131, right col., line 1-3) of the interpolation frame and an image frame (F1, Fig.2) corresponding to the interpolation frame; a vector difference between a motion vector of the interpolation frame which is detected with respect to the image frames and a motion vector of the interpolation frame which is derived based on

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the first motion vector with respect to the image frames; and a motion detection method which is used for detecting the first motion vector.

Regarding **claim 6**, Puri discloses everything claimed as above (see claim 2). In addition, Puri discloses wherein the additional information (MCIE, pp.131, right col., line 1-3) is information produced for every interpolation frame (quantized and encoded as in single-frame CMCI, pp.132, left col., first paragraph).

Regarding **claim 8**, Puri discloses everything claimed as above (see claim 1). In addition, Puri discloses wherein, when the additional information (MCIE, pp.131, right col., line 1-3) is not included in the encoded image signal, the interpolation frame creation unit creates the interpolation frame (Fig.2 and Fig.3 Frame Interpolation) based on the image frames which are decoded (Decoded frame F0 and F2 in Fig.2).

Regarding **claim 17**, Puri discloses An interpolation frame creating system for creating an interpolation frame (Fig.5 and Fig.6: CMCI MPEG encoder and decoder) which interpolates image frames forming an image signal, comprising:
first motion vector detection unit operable to detect a first motion vector (d_{02} , Fig.2) which is a motion vector between the image frames (F0 and F2, Fig.2);
additional information production unit operable to produce additional information (MCIE (Motion Compensated Interpolation Error), pp.131 left col., paragraph 2) for creating the interpolation frame (Interpolation Estimate, Fig.7) based on the first motion vector;
encoding unit (VWL Encode and Multiplex, Fig.5) operable to encode the image frames and the additional information;
decoding unit (Fig.6 operable to decode the image frames and the additional

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information which are encoded;

second motion vector detection unit operable to detect a second motion vector (d_{01} and d_{12} , Fig.2) which is a motion vector between the image frames (F0 and F1, or F1 and F2, Fig.2) which are decoded; and

interpolation frame creation unit operable to create an interpolation frame based on the second motion vector (d_{01} and d_{12} , Fig.2), the image frames (F0 and F2, Fig.2) which are decoded, and the additional information (MCIE (Motion Compensated Interpolation Error), pp.131 left col., paragraph 2) which is decoded.

Regarding **claim 18**, Puri discloses An integrated circuit device (VLSI, pp.140, left col., last line), comprising:

a decoding section (Fig.7 CMCI-MPEG Decoder) for decoding an encoded image signal (Bitstream, Fig.7) which is obtained by encoding image frames which form an image signal, and additional information (MCIE (Motion Compensated Interpolation Error), pp.131 left col., paragraph 2) for creating an interpolation frame (Interpolation Estimate, Fig.7) which interpolates the image frames based on a first motion vector (d_{02} , Fig.2) which is a motion vector between the image frames (F0 and F2, Fig.2);

a motion vector detection section for detecting a second motion vector (d_{01} and d_{12} , Fig.2) which is a motion vector between the image frames (F0 and F1, or F1 and F2, Fig.2) which are decoded; and

an interpolation frame creation section for creating an interpolation frame (reconstructed frame, Fig.7) based on the second motion vector (d_{01} and d_{12} , Fig.2), the image frames

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(F0 and F2, Fig.2) which are decoded, and the additional information (MCIE (Motion Compensated Interpolation Error), pp.131 left col., paragraph 2) which is decoded.

Regarding **claim 19**, Puri discloses An integrated circuit device (VLSI, pp.140, left col., last line), comprising:

a first motion vector detection section for detecting a first motion vector (d_{02} , Fig.2)

which is a motion vector between image frames (F0 and F2, Fig.2) forming an image signal;

an additional information producing section for producing additional information (MCIE (Motion Compensated Interpolation Error), pp.131 left col., paragraph 2) for creating an interpolation frame (Local Reconstructed, Fig.5) which interpolates the image frames based on the first motion vector; and

an encoding section (VWL Encode and Multiplex, Fig.5) for encoding the image frames and the additional information.

Regarding **claim 20**, the claimed invention is a computer readable medium claim corresponding to the apparatus claim 1. Therefore, it is rejected for the same reason as claim 1.

Regarding **claim 21**, the claimed invention is a computer readable medium claim corresponding to the apparatus claim 19. Therefore, it is rejected for the same reason as claim 19.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 3, 9-11, 13, 15-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Puri.

Regarding **claim 3**, Puri discloses everything claimed as above (see claim 2). However, Puri is silent on wherein the additional information further includes profile information for specifying a combination of information included in the additional information.

However, Puri discloses CMCI (conditional Motion Compensated Interpolation) such that residual (motion compensated interpolation error) is only transmitted when it is significant.

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Puri by providing specifically embedding the flag (profile information), in order to inform whether there is residual or not. The Puri CMCI coding, Incorporating embedding the flag (profile information) in order to inform whether there is residual or not, has all the features of claim 3.

Regarding **claim 9**, the claimed invention is the decoder corresponding to encoder described by claim 1. Decoder is the inverse of the encoder. Therefore, it was obvious over Puri.

Regarding **claim 10**, the claimed invention is the decoder corresponding to encoder described by claim 2. Decoder is the inverse of the encoder. Therefore, it was obvious over Puri.

Regarding **claim 11**, the claimed invention is the decoder corresponding to encoder described by claim 3. Decoder is the inverse of the encoder. Therefore, it was obvious over Puri.

Regarding **claim 13**, the claimed invention is the decoder corresponding to encoder described by claim 6. Decoder is the inverse of the encoder. Therefore, it was obvious over Puri.

Regarding **claim 15**, Puri teaches everything claimed as above (see claim 11). Puri teaches embedding the flag (profile information) in order to inform whether there is residual or not (see above claim 3).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Puri by providing specifically wherein the profile information is included as header information of a stream of the image signal, in order to inform whether there is residual or not. The Puri CMCI decoding, Incorporating embedding the flag (profile information) in order to inform whether there is residual or not, has all the features of claim 15.

Regarding **claim 16**, Puri teaches everything claimed as above (see claim 9). Puri further discloses wherein, when a residual between an interpolation frame created based on the image frames and the image signal corresponding to the interpolation frame is small, the encoding unit does not encode the additional information (Motion-

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compensated interpolation error is coded where it is significant, pp.131. left col., paragraph 2).

6. **Claims 4-5, 7, 12, and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Puri in view of Hosono (US 5,796,438), hereafter referenced as Hosono.

Regarding **claim 4**, Puri discloses everything claimed as above (see claim 2). However, Puri fails to disclose wherein: the motion detection method is included as code information for specifying a combination of parameters of motion detection; and the motion vector detection unit detects the second motion vector based on the parameters of the motion detection specified by the code information.

In the similar field of endeavor, Hosono discloses Method and Apparatus for Interpolating Picture Information. Hosono specifically discloses wherein: the motion detection method is included as code information (full_pel_forward_vector, col.10, line 65-66) for specifying a combination of parameters of motion detection (Full pel or Half pel motion vector, col.10, line 64-67), in order to specify pel or half-pel based motion estimation (col.10, line 64-67).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Puri by providing specifically full or half pixel motion estimation based on motion detection method (full_pel_forward_vector), in order to specify pel or half-pel based motion estimation. The Puri CMCI coding, incorporating the Hosono full or half pixel motion estimation

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based on motion detection method (full_pel_forward_vector), has all the features of claim 4.

Regarding **claim 5**, the Puri CMCI coding, incorporating the Hosono full or half pixel motion estimation based on motion detection method (full_pel_forward_vector), as applied to claim 4, disclose everything except wherein, when the motion detection method included in the additional information cannot be performed, the motion vector detection unit detects the second motion vector using a predetermined motion detection method determined in accordance with the motion detection method included in the additional information.

However, it was obvious to one of ordinary skill in the art at the time invention that if half-pel motion detection was indicated but cannot be performed because of computation burden, the pixel accuracy motion estimation can be substituted, in order to reduce computation cost.

Regarding **claim 7**, the Puri CMCI coding, incorporating the Hosono full or half pixel motion estimation based on motion detection method (full_pel_forward_vector), as applied to claim 4, disclose wherein the motion detection method in the additional information is information produced for every stream (Hosono: the picture layer, col.10, line 64-67) of the encoded image signal.

Regarding **claim 12**, the claimed invention is the decoder corresponding to encoder described by claim 4. Decoder is the inverse of the encoder. Therefore, it was obvious over Puri in view of Hosono.

Regarding **claim 14**, the claimed invention is the decoder corresponding to encoder described by claim 7. Decoder is the inverse of the encoder. Therefore, it was obvious over Puri in view of Hosono.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on 571-272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner, Art Unit 2621

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Primary Examiner, Art Unit 2482
November 8, 2010